SECTION 02300: EARTHWORK

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

The work includes all requirements to excavate and dispose of existing soils, asphalt pavement, concrete, and refuse from the North Bank of Whatcom Creek and localized areas on the South Bank, and to furnish and place appropriate backfill, cap, and rock armoring materials as indicated on the Contract Drawings and as described in these Specifications.

1.02 JOB CONDITIONS

A. Subsurface Conditions

Numerous soil sampling and exploratory borings have been accomplished at the Holly Street landfill site. A site plan showing locations of explorations, associated boring logs, and physical testing results are included in Appendix A of the accompanying Design Analysis Report.

The explorations are representative of the subsurface conditions at their respective locations. These conditions are generally described below. However, the Contractor shall determine the soil classifications to their own satisfaction prior to bidding. The materials encountered may vary somewhat from the descriptions provided in this Contract. Such variations will not be considered material differences from the Contract and, if encountered, variations in the materials from what is described here will not be considered as a basis for claims due to differing site conditions.

In general, the site's subsurface conditions appear to consist of a variably thick surficial layer of granular fill soils overlying landfill refuse. The majority of site excavation is expected to take place in the landfill refuse.

History of Site Landfilling. In the late 1800's, the Holly Street Landfill site was part of the original Whatcom Creek estuary and mudflat. Around

1905, private property Owners began filling portions of the site with dredge spoils and other materials to increase usable upland areas. From 1937 to 1953, and possibly continuing to as late as 1959, municipal waste was disposed on private tidelands within the former Whatcom Creek Estuary. Wastes disposed at the site included debris and scrap materials, consistent with landfill disposal practices of the time.

Physical Characteristics of Landfill Refuse. Most of the wastes disposed at the site are generally described in the historical documents as inorganic materials, largely devoid of putrescible wastes or flammable items, which were disposed at other locations. Specific descriptions of waste materials disposed at the Holly Street Landfill site have included glass, concrete, household debris, metal scrap, soil, coal slag, ashes, and woody debris, consistent with landfill disposal practices of the time. Few of the waste materials are currently exposed at the surface, and instead are largely covered by soil fills, gravel, buildings, and asphalt.

Based on a review of soil and solid waste boring logs conducted at the Holly Street Landfill Site (presented in Appendix A of the Design Analysis Report), there are likely to be significant variations in density within the landfill debris; voids may also be present. During excavation some of the softer spots may slough when exposed.

Although explorations conducted to date did not identify any large-scale hard debris, concrete or steel objects, or other potential impediments to excavation, it is possible that such materials or objects may be present in the site soils. Debris and existing riprap are expected to be present in some areas to be excavated. Riprap is present and visible on many of the existing slopes in the area. Concrete slabs, large timbers and similar waste materials, and other types of miscellaneous debris are also on the creek banks in some locations. The amount, distribution, and exact nature of debris is unknown. However, owing to the nature of this area as a historically active landfill, it is expected that various types of debris will be present. The Contractor(s) shall satisfy themselves(s) as to the potential for such debris and shall account for this in their bid.

B. Site Groundwater and Tidal Conditions

The groundwater system at the Holly Street Landfill site consists of a shallow unconfined aquifer within the refuse and underlying sediments. Depth to groundwater at the Holly Street Landfill site ranges from about 7 feet in the northwest refuse area to about 25 feet in the southeastern portion of the Maritime Heritage Park.

Whatcom Creek is tidally influenced in the area of the proposed Project work, and experiences low and high daily tides with magnitude, duration, and schedule effectively equivalent to nearby Bellingham Bay (which is encountered immediately west of the Holly Street bridge). Furthermore, this portion of Whatcom Creek is also influenced by fluctuations in water level as a result of precipitation and other factors that affect flow including upstream controls.

Monitoring performed during the RI/FS (Anchor and Aspect, 2003) indicated that copper and zinc concentrations exceed MTCA surface water cleanup levels in shoreline seeps along portions of the northwest lobe of the Holly Street Landfill. The geochemical data suggest that water within the Whatcom Creek estuary, high in dissolved oxygen, migrates into the shallow groundwater zone during high tides, creating oxidizing conditions within the saturated refuse. As discussed in the RI/FS, oxidizing conditions are expected to mobilize copper and zinc present within the refuse.

C. Availability of Reports

Complete reports are available at the offices of Anchor Environmental, L.L.C. and at the City of Bellingham, Office of Neighborhoods and Community Development for Contractor review. Anchor Environmental is located at 1423 3rd Avenue, Suite 300, Seattle, Washington. City offices are located at 144 W Magnolia Street, Suite 501, Bellingham, Washington.

1.03 SUBMITTALS

A. Construction Plan and Schedule

Not later than 14 days prior to the scheduled start of backfilling and capping operations, the Contractor shall submit a detailed, written Construction Plan and Schedule. No physical work is to be performed at the site until the Construction Plan and Schedule is reviewed and approved by the Engineer, the Owner, and Ecology.

The Construction Plan and Schedule will include (among others) a section entitled Excavation, Backfilling and Capping Plan. At a minimum, the Excavation, Backfilling and Capping Plan section of the Construction Plan and Schedule shall contain the following information:

1. The order in which the work is to be performed, indicating the work sequence; the number, types, and capacity of equipment to be used; hours of operation; methods of operation; and the time required to complete each activity.

2. Means of accomplishing work during periods of sufficiently low water levels so that as much work as possible can be performed "in the dry." This includes discussion of how excavation, backfilling, and capping activities will be accomplished below elevation +3 feet MLLW, where the available time periods of low water levels are briefer, as well as a detailed schedule of earthwork activities at these lower elevations.

3. A list of key construction personnel and the supervisory chain of responsibility.

4. The source of the backfilling and capping materials. Samples of the material are required to be submitted under Part 2.02 of this Section (02300 - Earthwork).

5. Procedures and equipment for coordinating and performing progress surveys.

6. Layout of the work and positioning of equipment to perform excavation, backfilling, and capping operations.

7. Procedures and sequence for placing backfill and cap materials.

8. Haul routes for imported materials.

B. Earthwork Materials

The Contractor shall submit test reports i for characteristics listed in Part 2.02 of this section for the following materials, included but not limited to:

1. Silty sand cap material

2. Well-graded gravel

3. Surficial gravel

4. Spalls

5. Riprap

6. Type A Topsoil

7. Type B Topsoil

8. Crushed Rock Base

1.04 STANDARD SPECIFICATIONS

The provisions and intent of the Contract, including the General Conditions, Supplemental Conditions, and General Requirements, apply to this work as if specified in this section. The standard Specifications for the work described in this section shall be the Standard Specification for Road, Bridge, and Municipal Construction prepared by the Washington State Department of Transportation (WSDOT) and the American Public Works Association (APWA), Washington State Chapter, 2002 Edition (or 2004 Edition if published at bid time). This document is available on the World Wide Web at: http://www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/2002SS.pdf

1.05 REGULATORY REQUIREMENTS

Backfilling and capping work under this Contract will be subject to the requirements of a U.S. Army Corps of Engineers 404 permit, issued prior to commencement of work.

The Contractor shall be responsible for adhering and conforming to all applicable provisions, conditions, and requirements of this permit.

Any conflicts between these Contract Specifications and issued permits will be brought to the attention of the Engineer. However, nothing whatsoever shall be deemed to authorize violation of issued permits.

PART 2 – PRODUCTS

2.01 GENERAL

The Contractor shall provide all required materials for the Project. Materials shall be of the quality, size, shape, and gradation as specified herein, or equal to that manufacture in the opinion of the Engineer.

2.02 BORROW SOURCE AND MATERIALS CHARACTERIZATION

The Contractor shall ensure that imported materials are natural, native, virgin materials and free of contaminants, including debris or recycled materials, and that they meet construction Specifications. The Engineer maintains the right to reject any materials that, in the Engineer's opinion, are determined to be substandard for any reason. In the event of rejections, it shall be the responsibility of the Contractor to remove all stockpiles of rejected material from the site.

A. General

A characterization of any and all imported material shall be performed or obtained by the Contractor prior to any on-site placement. The characterization will include analysis of borrow source samples, site inspection, and site characterization.

B. Source Identification

Prior to borrow source sampling, the Contractor shall provide documentation of the origin of borrow source materials and maps identifying specific location(s) of borrow sources.

C. Sample(s) Provided to the Engineer

The Contractor shall provide the Engineer with a 2-gallon sample of material from each borrow source, with the exception of riprap, which does not require a sample submittal. Each sample should be composited from no less than five subsamples taken throughout any one source. The Contractor shall assure that the samples(s) are representative of all materials to be imported. Sample(s) will be provided to the Engineer at least 14 days before the materials represented by the sample(s) are delivered to the site.

D. Inspection of Source

The borrow source shall be inspected by the Contractor. During such inspection, the Contractor shall assure that the materials to be delivered to the site are likely to meet the appropriate Specifications. The Contractor shall provide the Engineer with 14 day notice of such inspections. At the Engineer's discretion, the Engineer or the Engineer's designated representative may accompany the Contractor to witness such inspections. This witnessing shall in no way release the Contractor from complying with the Specifications and shall in no way be construed as approval of any particular source of material.

E. Testing, Reporting, and Certification

All placed earthwork materials shall meet the physical and chemical characteristics specified herein. Prior to the importation of any materials, the Contractor shall provide the Engineer with a certified test lab report of the sieve analysis of the product. The Engineer shall be the final determining factor in establishing compliance with sieve requirements.

No material shall be brought onto the job site until the initial sieve analysis has been approved in writing.

All imported earthwork materials shall be suitable for open-water disposal when tested against Dredge Material Management Program (DMMP) chemical guidelines.

The Contractor shall test sample(s) of all aggregate materials to be imported, with the exception of light loose riprap, for the following:

1. Grain Size Distribution (American Society for Testing and Materials [ASTM] method D422-63)
2. Priority Pollutant Metals (U.S. Environmental Protection Agency [EPA] publication SW846, the 6000/7000 method series)
3. Volatile Organic Compounds (EPA publication SW846, method 8260 as modified by Puget Sound Estuarine Protocols [PSEP])
4. Semivolatile Organic Compounds (EPA publication SW846, method 8270 as modified by PSEP)
5. Polychlorinated Biphenyls (PCBs) (EPA publication SW846, method 8082 as modified by PSEP)
6. Pesticides (EPA publication SW846, method 8081 as modified by PSEP)
7. Total Organic Carbon (Standard Methods [SM] method 5310B)

In addition, the Contractor shall obtain test results for all other properties that area specified in this section.

The Contractor shall provide the results of such tests at least 14 days before delivery of the materials to the site. The results shall be provided in report form, with the reports clearly identifying the following:

1. Source of samples
2. Sampling dates
3. Chain of custody
4. Sampling locations
5. Contractor's certification that the samples tested and the results provided are representative of materials that will be delivered to the site

The Contractor shall not import any material to the site until receiving written approval for that material from the Engineer.

F. Inspection of Materials at the Site

Truckloads of imported materials shall be visually inspected by the Contractor upon delivery. Materials shall be inspected for the presence of foreign, recycled, or reprocessed material. The Engineer may perform an independent inspection at any time. Material may be rejected if identified as substandard or test results show it to be substandard. Materials may be segregated for testing based on appearance or odor. Segregated materials may be tested according to designated procedures at the Engineer's discretion.

2.03 SILTY SAND CAP MATERIAL

A. Silty Sand Cap Material shall be imported soil consisting of naturally occurring earth, sand, and silt, free of frozen lumps, rocks greater than two inches in maximum dimension, and other deleterious matter. It shall have an organic content no greater than 10 percent.

B. Material shall be graded between the limits specified below:

Sieve Size	Percent Passing (by weight)
U.S. No. 4	100%
U.S. No. 10	50% to 80%
U.S. No. 40	25% to 50%
U.S. No. 200	15% to 25% (wet screen)

2.04 WELL-GRADED GRAVEL

A. Well-Graded Gravel shall be a clean, naturally-occurring round or sub-angular sandy gravel, primarily (greater than 80 percent) comprised of igneous or metamorphic rock. Individual stones shall be generally free of objectional coatings, seams, cracks, and other defects tending to destroy their resistance to weather. Bulk material shall be free of soil, clay balls, debris, wood, organic matter, and other extraneous material.

B. Well-Graded Gravel shall be graded between the limits specified below:

Sieve Size	Percent Passing (by weight)
8 inches	100%
4 inches	40% to 80%
1 inch	30% to 40%
U.S. No. 4	15% to 40%
U.S. No. 40	20% maximum

2.05 SURFICIAL GRAVEL

A. Surficial Gravel shall be a clean, free-draining, gravel and sand mix, from a recognized and established borrow site. The material shall be free of all objectionable coating.

B. Surficial Gravel shall be graded between the limits specified below:

Sieve Size	Percent Passing (by weight)
2 inches	**100%**
1 to 1½ inches	**80% to 95%**
¾ inch	**50% to 80%**
U.S. No. 4	**30% to 50%**
U.S. No. 200	**8% maximum (wet screen)**

2.06 SPALLS

Spalls shall be angular rock materials which meet the general requirements provided in Section 9-13 of the Standard Specifications, except that the following gradation is specified:

Sieve Size	Percent Passing (by weight)
10 inch	**100%**
6 inch	**30% to 50%**
2 inch	**10% to 30%**
.75 inch	**10% maximum**

2.07 RIPRAP

Riprap shall meet the general requirements provided in Section 9-13.1(2) of the Standard Specifications.

2.08 TOPSOIL

A. Type A Topsoil Mix:

Type A Topsoil Mix shall consist of 2/3 sandy loam and 1/3 composted organic material.

1. Sandy loam shall consist largely of sand, but with enough silt and clay present to give it a small amount of stability. Individual sand grains shall be of sufficient size to be seen and felt readily. On squeezing in the hand when dry, it shall form a cast that will not only hold its shape when the

pressure is released, but shall withstand careful handling without breaking.

2. The mixed soil shall meet the following gradation:

Sieve Size	Percent Passing (by weight)
3/8 inch	**100%**
#4	**95%**
#10	**85%**
#30	**70%**
#60	**50%**
#100	**30%**
#270	**15%**

3. Shall have pH range of 5.0 to 6.5, with dolomite lime added as necessary to attain this range.

4. Composted organic material shall consist of composted yard debris or organic waste material and shall consist of 100 percent recycled content. In addition, the organic material shall have the following characteristics:

   a) Shall be screened using a sieve no finer than 5/16 inch and no greater than 7/16 inch

   b) Shall pass a standard cress test for seed germination (90 percent germination compared to standard)

   c) Shall have a pH from 5.5 to 7.5

   d) Shall have a maximum electrical conductivity of 3.0 ohms/cm

   e) Shall have a maximum carbon to nitrogen ratio of 40:1

   f) Shall be certified by the Process to Further Reduce Pathogens (PFRP) guideline for hot composting as established by the United States Environmental Agency

g) Shall be fully composted, mature and stable before being acceptable

B. Type B Topsoil (for Intertidal Marsh)

Type B Topsoil will be used in the intertidal marsh area. It shall consist of a low permeability soil mix, with a uniform mixture of 80 percent silty clay and 20 percent compost (by volume). Compost shall be as specified above for Type A topsoil. Silty clay soil shall have no more than 50 percent (by weight) passing the number 200 sieve per ASTM D2487-90 soil classification using laboratory tests for "Fine Grained Soils-Slit and Clay."

2.09 CRUSHED ROCK BASE

Crushed Rock Base Course shall be placed over approved compacted subgrade in areas to receive cast-in-place concrete. It shall consist of 5/8" minus crushed rock, bearing no worn surfaces. The graduation shall be:

Sieve Size	Percent Passing
5/8" square sieve	**100%**
¼" square sieve	**50 – 75%**
No. 40 sieve	**8 – 24%**
No. 200 sieve	**10% maximum**

2.10 FILTER FABRIC

Filter fabric shall be a woven sheet of polymeric material which is chemically resistant to the conditions to which it will be exposed. Filter fabric shall be Mirafi 600X or approved equivalent.

2.11 COIR EROSION CONTROL FABRIC

A. Geocoir/DekoWe900 or approved equivalent. Available from Belton Industries, http://www.beltonindustries.com/, Roll size 118 inches, length 55 yards.

B. Stakes for coir fabric: Wood, Douglas Fir (untreated) stakes of the sizes shown on the Drawings.

PART 3 – EXECUTION

3.01 EXISTING UTILITIES

Known utility lines are shown on the Plans. However, this does not necessarily include all utility lines present, and may not be fully accurate. It is the Contractor's responsibility to ascertain for itself the locations and depths of any utilities or pipelines that may cross below the Project limits, Whatcom Creek, or the North Bank excavation area. It will also be the Contractor's responsibility to repair to pre-project conditions, at the Contractor's expense, any damage to buried utilities or pipelines caused by the Contractor's operations. The Contractor shall contact Utilities Underground Location Center (1-800-424-5555) for assistance in locating public utilities.

3.02 PROTECTION OF EXISTING FACILITIES

The Contractor shall exercise care when conducting its earthwork operations so as not to damage, undermine, or otherwise disturb existing structures, facilities, landscaping elements, and buildings (except for those that are specifically required to be removed). Care shall be taken when excavating, backfilling or capping not to hit any portions of the structures, facilities, and buildings with construction equipment. Any damage to existing structures or new structures that is caused by the Contractor's operations, as determined by the Engineer, shall be repaired at the Contractor's expense.

Existing monitoring well A-MW-3 in the area of excavation shall be abandoned in accordance with Department of Ecology guidelines. Refer to Appendix A of the Design Analysis Report for information on this and other monitoring wells in the vicinity of the site.

3.03 SURVEYING

A. Pre-Construction Survey:

The Contractor shall perform a pre-construction survey of the areas that will undergo earthwork activities. This pre-construction survey will be the basis against which subsequent surveys will be numerically compared for determination of pay quantities.

B. Post-Excavation Surveys:

The Contractor shall perform a Post-Excavation Survey before commencing backfilling and capping work in any given area, to verify excavation limits have been reached and to determine excavation quantities (by comparing to the Pre-Construction Survey). Survey data shall be made immediately available to the Engineer. The Engineer can choose to use the Contractor's survey data, or the Engineer can perform their own survey to calculate excavation quantities, in which case the Engineer's calculated quantity shall be the sole basis for payment.

C. Post-Backfill/Cap Survey:

After completion of backfilling and capping work, the Contractor shall perform a Post-Backfill/Cap survey. The Engineer may wish to perform their own survey for verification of backfill/cap grades and lift thicknesses, to ensure conformance to the specifications.

3.04 SITE EXCAVATION

A. General Excavation Requirements

The Contractor shall excavate to the lines, grades, slopes, and elevations shown on the Contract Drawings.

Excavation on slopes shall proceed downward, working from top of slope to toe of slope. As the work progresses, it is anticipated that some slope material will slough into the cut area. The Contractor shall remove this material and will make a final pass with the excavator bucket along the sections' edges when the excavation is completed to help assure proper backfill/cap depth.

The Contractor shall not store any equipment within five horizontal feet of the upper edge of any excavation.

The Contractor shall pay particular attention to the conditions of issued permits and authorizations requiring the minimization of turbidity and siltation and adherence to water quality requirements.

B. Schedule Constraints and Avoidance of In-Water Work

No excavation/backfill operations may occur during the times of fishery closure periods in Bellingham Bay, as determined by regulatory agencies such as the Washington Department of Fish and Game (WDFW). The start of WDFW's approved construction window is expected to be August 15 (or possibly earlier, subject to ongoing discussions).

All excavation along the North Bank will occur above elevation +3 feet MLLW. Localized excavations along the South Bank will generally take place above +3 feet MLLW as well, except for some areas where excavation is required at lower elevations.

All excavation shall be done "in the dry," meaning while the water level in Whatcom Creek is at least one vertical foot below the elevation of the excavation extent, at and throughout the duration of a the excavation activity. To accomplish this, excavation shall be done during periods of suitably low creek flow and suitably low tidal elevations. Each excavation procedure shall be completed before water levels rise to the elevation of the work. The Engineer shall be the ultimate judge of water level relative to planned excavations grades.

This requirement is applicable to excavation at all elevations. In localized portions of the south bank, limited excavation is required below elevation +3 feet MLLW. If the Contractor can demonstrate, to the satisfaction of the Engineer, that excavation below +3 feet MLLW in these areas is infeasible "in the dry," then excavation below +3 feet MLLW may be done through water only if previously approved in writing by the Engineer, and subject to the following conditions:

- In-water excavation in these areas shall be accompanied by water quality monitoring (as described in Section 02370 – Environmental Protection).
- In-water excavation in these areas may be observed by representatives of the City, the Engineer, and Ecology. The Contractor shall contact these parties at least seven days before doing any in-water excavation.
- Depending on water quality monitoring results, and on observations made in the field during in-water excavation, the Contractor may be required to institute water quality conservation measures and Best Management Practices (BMPs), as described in Section -2370 and in the Construction Quality Assurance Plan.

C. Management of Excavated Surfaces

The Contractor shall be aware of the potential for erosion, contamination, and generation of water sheen from newly excavated surfaces. The Contractor shall control the potential for erosion of materials and loss of contaminants from freshly exposed excavated surfaces by rolling the surfaces flat and smooth prior to the next tidal inundation. If this procedure is judged to be insufficient for protection against erosion in the opinion of the Engineer, then the Contractor shall institute additional procedures. Additional methods of controlling erosion include, but are not limited to, the following procedures:

1. Laying down the first lift of capping material on the freshly excavated subgrade immediately after excavation and prior to inundation by the tide, depending on conditions encountered in the field during construction. The Engineer will need to confirm that appropriate excavated grades were met prior to placing this initial lift.

2. Placement of filter fabric geotextile material over the freshly placed excavated subgrade prior to the next tidal inundation.

3. Use of approved BMPs for locations where excavation must be performed in-water, subject to the discretion of the City, the Engineer, and Ecology.

4. The Contractor may propose suitable alternatives, requiring the approval of the Engineer.

D. Excavation Along ReStore Building

The Contractor shall only excavate along the length of this building the extent which can be capped during the same work shift. Excavation shall be offset from the edge of the existing building a minimum of five feet. The Contractor shall place a 1-foot-thick lift of capping material at the edge of this excavation extending down to the toe of cut before the end of each shift.

E. Debris and Hazardous Waste

It is possible that the Contractor may encounter large debris or riprap that extends above or below the planned excavation grades. Depending upon the factors observed, including the type of the debris, and its estimated size and impact on the cap design if left in place, the Engineer may or may not order its removal. Removal volume will be treated as additional "Excavation and Grading" pay quantity.

Such large debris or riprap shall become the property of the Contractor, and shall be salvaged (if possible), or disposed at an appropriate off-site location. The cost of removing and disposing of such debris is incidental to the Contract and is considered part of the bid price for Excavation and Grading.

F. Disposal

Excavated landfill refuse and other soils shall be transported to a permitted landfill (such as the Roosevelt Regional Landfill).

Hazardous material and hazardous waste (as defined under the Resource Conservation and Recovery Act) shall be disposed of in accordance with

applicable federal, state, and local regulations. If and when such hazardous material/waste is encountered, the Contractor shall immediately notify the Engineer to determine what course of action is to be taken.

3.05 BACKFILLING AND CAPPING

A. General Requirements

The Contractor shall furnish and place materials to backfill and cap portions of Whatcom Creek as shown on the Contract Drawings. Any backfill or cap material that is deposited other than in the areas indicated on the Contract Drawings, or other than as approved by the Engineer, will not be included in the measurement for payment, and the Contractor may be required to remove such misplaced material and remove it or deposit it where directed at the Contractor's own expense.

The Engineer shall approve of the excavated conditions and grades before the Contractor commences backfilling or capping in the locations shown on the Plans.

Cap thickness will be verified by the Engineer, based on the difference between the Post-Excavation Survey and the Post-Backfill/Cap Survey of the site.

For capping areas with a specified thickness of multiple feet, the Contractor shall place the cap material in several lifts, each no thicker than 12 inches loose thickness. The first lift of cap material shall be placed with care so as to minimize disturbance of the underlying subgrade material. After the first lift of material has been placed, the Contractor may utilize any appropriate backfilling and capping method to construct the rest of the cap provided that the method that does not impact previous lifts.

B. Avoidance of Material Placement Through Water

Capping materials along the North Bank shall be placed only when water levels are one foot or more below subgrade elevation at the location of

capping or backfilling. The Engineer shall be the ultimate judge of water level relative to the backfilling and capping elevations.

Similarly, construction of the gravel berm (along the north bank) and rock buttress (along the south bank) above elevation +3 feet MLLW shall occur only when water levels are one foot or more below the working elevation.

For construction of portions of the gravel berm and rock buttress below elevation +3 feet MLLW, the Contractor has the following options:

1. Use the same procedure specified for construction above elevation +3 feet MLLW. Place gravel and rock materials only when water levels are one foot or more below the working elevation.

2. Place gravel and rock materials below elevation +3 feet MLLW through no more than two feet of water. Such work shall be accompanied by water quality monitoring (as described in Section 02370 – Environmental Protection), and possible use of water quality conservation measures and Best Management Practices (BMPs), as described in Section 02370 and in the CQAP, and as subject to the discretion of the City, the Engineer, and Ecology. Furthermore, if the Contractor elects to place materials through the water, placement shall be accomplished using equipment and techniques that cause minimal disturbance to the underlying sediments and create minimal turbidity in the water. The Contractor shall provide at least seven days notice to the City, the Engineer, and Ecology prior to accomplishing any material placement through the water.

3.06 PLACEMENT OF TOPSOIL

Place topsoil in one or two lifts, each no thicker than 6 inches, to the specified lines and grades. Each topsoil lift shall be lightly tamped to a smooth condition, but not compacted to a dense condition

Rake out all rocks, roots, sticks and other debris larger than 1-inch diameter or sticks longer than three inches. Perform fine grading to attain finish grades as shown on the Plans. Leave surface even and readily able to accommodate lawn or planting installation.

Topsoil in areas adjoining at grade paths shall be level with adjacent paving surfaces for smooth transition to adjacent surfaces.

Install coir erosion control fabric to the limits shown on the Drawings and per manufacturer's instructions. Install Coir fabric when tide levels are below the working surface.

3.07 COMPACTION

Silty Sand Cap Material and Well-Graded Gravel shall be compacted to at least 90 percent of maximum dry density minimum as specified by ASTM D 1557. Where Silty Sand Cap Material and Well-Graded Gravel must be moisture conditioned before compaction, uniformly apply water to the layer of material to prevent free water appearing on surface during or subsequent to compaction operations. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. If necessary, assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

Subgrades below Crushed Rock Base Course (for concrete pavement sections) shall be compacted to a firm and non-yielding condition, as determined by the Engineer.

3.08 INSPECTION

The Contractor shall notify the Engineer at least 48 hours in advance of the time of inspection required for completion of excavation or capping, compaction, subgrade preparation, or completion of soil preparation for planting of vegetation (trees, shrubs, and groundcovers), prior to placement of Coir material.

PART 4 –MEASUREMENT AND PAYMENT

Volumes of excavated materials, and volumes of earthwork materials used in accordance with these specification and Plans, will be paid for on a unit price basis as presented in the Schedule of Unit Prices, by the CUBIC YARD and TON, respectively.

Extra earthwork materials – including additional capping materials, spalls, riprap, and topsoil (as separate pay items) – that are required above and beyond the areas, extents, and volumes specified herein and on the Plans, shall be measured by cubic yard placed, as determined by progress surveys, and paid for by the ton, delivered to the jobsite and incorporated into the work in accordance with these Plans and Specifications. If certified weight tickets are not available for a particular material source, a conversion factor of 1.5 tons per cubic yard will be used for payment. Payment for these extra earthwork materials shall be full compensation for furnishing, loading, transporting, handling, and placing each respective earthwork material in accordance with these Specifications.

4.01 MEASUREMENT

The unit of measurement for excavation of materials shall be the BANK CUBIC YARD. Quantity shall be determined based on the surveyed volume difference between initial grade and final excavation grade, before any backfill is placed.

The unit of measurement for importing and placing or applying capping materials, rock, or topsoil, shall be the TON, based on measured weight of material used. Only truck loads of material actually used for an approved purpose in accordance with these Specifications will be considered part of the measurement. Material which is hauled away shall be weighed and deducted from the amount brought on site. Certified scale tickets will be the basis for payment to the Contractor, subject to verification by the Engineer through comparison of Post-Excavation Surveys and Post Backfill/Cap Surveys.

4.02 PAYMENT

Payment for EXCAVATION AND GRADING will be full compensation for excavating soil, removing debris, placing excavated materials into temporary

stockpiles, and attaining specified grades. Any excavation that does not comply with project Plans and Specifications will not be paid for.

Payment for IMPORT AND PLACE specified materials shall be full compensation for furnishing, loading, transporting, handling, and placing backfill and capping materials in accordance with these Specifications and the Contract Drawings. Any backfill and capping materials furnished, loaded, transported, handled and/or placed, that do not comply with project Plans and Specifications, will not be paid for.

END OF SECTION 02300